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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/856,139	05/29/2001	Fumiaki Maruyama	107242-00017	3293

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EXAMINER
MAI, ANH D

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 06/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/856,139	MARUYAMA ET AL.	
	Examin r	Art Unit	
	Anh D. Mai	2814	

-- The MAILING DATE of this communication appears on th cover she t with th corr spondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 April 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *27-77* is/are pending in the application.

4a) Of the above claim(s) *27-66* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *67-77* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

1. Amendment filed April 6, 2004 has been entered. Claim 68 has been amended. Claims 27-77 are pending. Non-elected invention, claims 27-66 have been withdrawn.

Drawings

2. The drawings, Figs. 10 and 11 were received on April 6, 2004. These drawings are acceptable.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 67 and 69 are rejected under 35 U.S.C. 102(b) as being anticipated by Kobayashi et al. (U.S. Patent No. 5,997,598) of record.

Kobayashi teaches a clean room air conditioning facilities as claimed including:

an air conditioner having a boron-less filter and a boron adsorbing filter (ULPA filter), and one or more of wafer treatment apparatuses (local facilities) each having a boron-less filter (ULPA filter), wherein an atmosphere gas is recycled (return air) between the air conditioner, the clean room and the wafer treatment apparatuses. (See Example 3).

With respect to term "boron-less filter", this term is defined in the specification as – an air filter from which no boron is released. (Page 8, line 25 to page 9, line 2).

Since the filter of Kobayashi does not release boron, the limitation of claim 67 is met.

With respect to claim 69, an Official Notice is taken regarding the internal pressure of a wafer treatment apparatus (local facilities) is adjusted to be higher than a clean room internal pressure and the clean room internal pressure is be higher than a clean adjusted to be higher than an external pressure (outside). These are well known as positive pressure to prevent uncontrolled air from the clean room entering the wafer treatment apparatus as well as uncontrolled air from the outside entering the clean room.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 68 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi '598 as applied to claim 67 above, and further in view of Johnson (U.S. Patent No. 6,102,977).

Kobayashi teaches a boron-less filter and boron absorbing filter for use in eliminating boron in the production of semiconductor.

Thus, Kobayashi is shown to teach all the features of the claim with the exception of explicitly disclosing such filter be placed in an outdoor air cleaner.

However, Johnson teaches that it is desirable to provide a make-up (outside) air handler that is not a potential source of boron contamination of the outside air. (See col. 2, lines 16-21).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to further place the boron-less filter and boron absorbing filter of Kobayashi in the outdoor (make-up) air cleaner as taught by Johnson to eliminate the potential source of boron into the clean room from the outside air.

5. Claim 70 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi '598 as applied to claim 67 above, and further in view of Applicant admitted prior art (hereinafter AAPA).

Kobayashi teaches fabricating semiconductor wafer utilizing a clean room air conditioning facilities.

Thus, Kobayashi is shown to teach all the features of the claim with the exception of explicitly disclosing the amount of boron attaches on the surface of the wafer.

However, AAPA teaches fabricating semiconductor device on a semiconductor wafer having attaches boron amount on the surface of the silicon wafer of $1x10^{10}$ atoms/cm^2. (See page 2, ll. 10-17).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to utilize the clean room of Kobayashi in the fabricating a semiconductor device on the wafer as taught by the AAPA because the clean room of Kobayashi would have avoid unnecessary doping of the wafer by eliminating dopant in the ambient.

6. Claims 71-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi '598 as applied to claim 67 above, and further in view of Mitani et al. (U.S. Patent No. 5,804,494) (hereinafter Mitani) and AAPA.

With respect to claims 71-73, Kobayashi teaches fabricating semiconductor wafer utilizing a clean room air conditioning facilities.

Thus, Kobayashi is shown to teach all the features of the claim with the exception of explicitly utilizing the wafer having boron concentration in the bulk silicon and a surface layer formed on the bulk silicon in the apparatus.

However, AAPA teaches fabricating semiconductor device including forming a surface layer (62) on a bulk silicon wafer (W). (See Figs. 10a-e, page 2, line 10-page 4, line 17).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to utilize the clean room of Kobayashi in the manufacturing process of wafer having the surface layer on the bulk silicon as taught by the AAPA because the clean room of Kobayashi would have avoid unnecessary addition of boron on the wafer surface by eliminating boron in the ambient.

Further, Mitani teaches a conventional silicon wafer having boron concentration in the range of 10^{15} atoms/cm^3. (See third embodiment, Fig. 7).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to utilize the clean room of Kobayashi in the manufacturing process of AAPA having boron concentration in bulk silicon in the range of 10^{15} atoms/cm^3 as taught by Mitani since boron have been eliminated form the ambient in the clean room, thus, boron contamination of the wafer surface is avoided.

With respect to the increment of boron concentration in the surface layer down to the depth of 0.5μm, since the wafer (W) of the admitted art has been subjected to a thermal treatment following the formation of the surface layer, polysilicon (62), thus, boron from the surface of wafer (W) is known to diffuse toward the bulk silicon, thus, result in increment of boron concentration. (See page 2, ll. 10-16).

With respect to claims 74-77, a similar reasoning as that of claims 71-73 above is also applied here. Further, the silicon wafer (W) of the admitted art also includes a CVD silicon oxide film (64) provided on the polysilicon layer (62). (See Fig. 10c).

Response to Arguments

7. The objections to drawings and claim 68 are withdrawn because substitute drawings and amendment to claim have been provided.

8. Applicant's arguments filed April 6, 2004 have been fully considered but they are not persuasive.

Rejections under 102:

Applicants appear to contend that the filter of Kobayashi contains 15-52 μg/g of boron thus, does not teach or suggest the "boron-less filter".

However, as discussed above, the term "boron-less filter" has been clearly defined in the specification as *an air filter from which no boron is released.* (See page 8 line 25 to page 9, line 2). Kobayashi clearly teaches: "since the organic phosphorous compound and the boron

compound are not present in the local facilities." (See col. 15, lines 9-17). Thus, Kobayashi clearly teaches using "boron-less filter" for the clean room and local facilities.

Rejections under 103:

Applicants appear to argue that since Kobayashi does not teach the "boron-less filter" thus, the combination of Kobayashi and Mitani and AAPA fails to make the dependent claims obvious.

However, since Kobayashi clearly anticipates claim 67, as discussed above, including "boron-less filter", therefore, the dependent claims are obvious over the combination of the cited references.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A.M
June 02, 2004